

IN THE CLAIMS:

Amendments to the Claims

Please amend claims 1, 4 and 30 as shown below and please cancel claims 31 and 32 without prejudice or disclaimer of the subject matter thereof.

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method of treating a surface of a sample having a film formed on a thin underlying film, which film is etched as a main part of etching, comprising the steps of:

generating a plasma in a treatment chamber;

applying an rf bias voltage of a frequency of at least 100 kHz so that ions of intermediate energy which promote etching reaction while providing poor directionality are reduced, and ions of high energy having a high directionality and ions of low energy which do not contribute to etching are increased, so as to have at least one peak point at a region of high ion energy and at least one peak point at a region of low ion energy for anisotropic etching, and the rf bias voltage to which a peak to peak voltage V_{pp} value larger than a V_{pp} value of a continuous rf bias voltage at which the same etch rate can be obtained is given, so as to have the high ion energy which is larger than a high ion energy of the continuous rf bias voltage, is applied to a stage on which a sample is placed independently of the generation of the plasma; and

on-off modulating the rf bias voltage by effecting modulation of the rf bias voltage for one period of anisotropic etching treatment of the sample which is prior to another period of etching treatment of the surface of the sample in which selectivity is higher than selectivity at the one period and in which modulation of the rf bias voltage is not effected, wherein said one period of anisotropic etching treatment in

which the modulation of the rf bias voltage is effected is applied to said film as a main part of etching, and said another period of etching treatment in which the modulation of the rf bias voltage is not effected and having a higher selectivity than the selectivity in said one period is applied to a small amount of said film which remains before said thin underlying film is exposed.

Claims 2 and 3 (canceled)

4. (currently amended) A method of treating a surface of a sample having a film formed on a thin underlying film, which film is etched as a main part of etching, comprising the steps of:

generating a plasma in a treatment chamber;

applying an rf bias voltage of a frequency so that ions of intermediate energy which promote etching reaction while providing poor directionality are reduced, and ions of high energy having a high directionality and ions of low energy which do not contribute to etching are increased, so as to have at least one peak point at a region of high ion energy and at least one peak point at a region of low ion energy for anisotropic etching, and the rf bias voltage to which a peak to peak voltage V_{pp} value larger than a V_{pp} value of a continuous rf bias voltage at which the same etch rate can be obtained is given, so as to have the high ion energy which is larger than a high ion energy of the continuous rf bias voltage, is applied to a stage on which a sample is placed independently of the generation of the plasma; and

on-off modulating the rf bias voltage by effecting modulation of the rf bias voltage for one period of anisotropic etching treatment of a surface of the sample which is prior to another period of etching treatment of the surface of the sample in which selectivity is higher than selectivity at the one period and in which modulation of the rf bias voltage is not effected, wherein said one period of anisotropic etching treatment in which the modulation of the rf bias voltage is effected is applied to said

film as a main part of etching, and said another period of etching treatment in which the modulation of the rf bias voltage is not effected and having a higher selectivity than the selectivity in said one period is applied to a small amount of said film which remains before said thin underlying film is exposed;

wherein a duty ratio of the on-off modulation of the rf bias voltage is set to 5 to 50%.

Claims 5-29 (canceled)

30. (currently amended) A method of treating a surface of a sample, comprising the steps of:

generating a plasma in a treatment chamber;

applying an rf bias voltage of a frequency so that ions of intermediate energy which promote etching reaction while providing poor directionality are reduced, and ions of high energy having a high directionality and ions of low energy which do not contribute to etching are increased, so as to have at least one peak point at a region of high ion energy and at least one peak point at a region of low ion energy for anisotropic etching, and the rf bias voltage to which a peak to peak voltage V_{pp} value larger than a V_{pp} value of a continuous rf bias voltage at which the same etch rate can be obtained is given, so as to have the high ion energy which is larger than a high ion energy of the continuous rf bias voltage, is applied to a stage on which a sample is placed independently of the generation of the plasma; and

on-off modulating the rf bias voltage by effecting modulation of the rf bias voltage for one period of an anisotropic main etch of ~~the a~~ first layer of the sample which is prior to another period during which ~~the a~~ second thin layer which underlies the first layer is exposed and in which selectivity is higher than selectivity at the one period and in which modulation of the rf bias voltage is not effected, wherein said one period of anisotropic etching treatment in which the modulation of the rf bias

voltage is effected is applied to said first layer as a main part of etching, and said another period of etching treatment in which the modulation of the rf bias voltage is not effected and having a higher selectivity than the selectivity in said one period is applied to a small amount of said first layer which remains before said underlying second thin layer is exposed;

wherein the at least one peak point of the region of the high ion energy and the at least one peak point of the region of the low ion energy has a number of ions which is at least twice a number of ions in a region of the intermediate ion energy.

Claims 31-33 (canceled)

34. (previously presented) A method according to claim 1, wherein the modulation of the rf bias voltage in the on-off modulating is effected at a frequency of at least 100 Hz.

35. (previously presented) A method according to claim 4, wherein the applying of the rf bias voltage is effected at frequency of at least 100 kHz and the modulation of the rf bias voltage in the on-off modulating is effected at a frequency of at least 100 Hz.

36. (previously presented) A method according to claim 30, wherein the applying of the rf bias voltage is effected at frequency of at least 100 kHz and the modulation of the rf bias voltage in the on-off modulating is effected at a frequency of at least 100 Hz.